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Mental health and quality of life in non-binary transgender adults: A case control study

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ABSTRACT

Background: The social challenges that non-binary people experience, due in part to social intolerance and the lack of validation of non-binary gender identities, may affect the mental health and quality of life of this population. However, studies that have distinguished between non-binary and binary transgender identities are lacking.

Aim: To compare the mental health and quality of life of a community sample of non-binary transgender adults with controls (binary transgender people and cisgender people) matched on sex assigned at birth.

Method: A total of 526 participants were included. Ninety-seven were classified as non-binary and were compared with two control groups: 91 people classified as binary and 338 cisgender people. Only transgender people not on gender affirming hormone treatment or who had not undergone gender affirming surgery were included. Participants were invited to complete an online survey that included mental health and quality of life measures.

Results: Non-binary people reported significantly better mental health than binary transgender people, but worse than cisgender people. Overall, there were no significant differences in quality of life between non-binary and binary transgender participants assigned male at birth and transgender females, but non-binary assigned males at birth had better scores on the psychological and social domains of quality of life than transgender males. Quality of life was better across all domains in cisgender people than transgender groups.

Conclusion: There is an inequality with regard to mental health and quality of life between non-binary (and binary) transgender people and the cisgender population that needs to be addressed. The better mental health scores in non-binary people may reflect lower levels of body dissatisfaction among the non-binary population. Mental health problems and poor quality of life are likely to have social causes and hence legislative measures and broader government-led inclusive directives should be put in place to recognize and to validate non-binary identifying people.

KEYWORDS
Gender equality; mental health; non-binary; quality of life; social cause of distress; transgender

Introduction

In the last decade there has been an increasing interest in gender diversity and its expression. *Non-binary* is one of the umbrella terms used to describe people who identify outside the binary gender construct (Richards et al., 2016) and will be the terminology used in the current study. Within this umbrella term, people who have a fixed gender identity, but identify as both male and female, may identify as *androgynous* or *mixed gender*. People who have a fluid gender identity (i.e., they move between genders) may identify as *bigender*, *gender fluid*, or *gender flux*. Some people may identify with a specific additional gender (i.e., something other than male or female) and therefore may identify as *third gender* or *other gender*. Some people may feel they have no gender and identify as *agender*, *gender neutral*, *non-gendered*, or *genderless*, for example (Richards et al., 2016). (The non-binary gender identities listed here are not exhaustive; see Richards et al. (2016) for comprehensive coverage of non-binary terminology.)

Estimating the prevalence of non-binary transgender people in any given country is difficult due to the lack of data in this area. A large

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national LGBT survey in the United Kingdom (UK) (which had 14,320 responses) found that 52% of respondents identified as non-binary (Government Equalities Office, 2018). Other studies using representative population samples, while not finding such large prevalence rates, have still identified significant numbers. For example, in a Dutch sample, Kuyper and Wijsen (2014) found 4.6% of people assigned male at birth and 3.2% of people assigned female reported gender ambivalence (which is defined as identifying equally with the other gender as with the gender assigned at birth), while Van Caenegem et al. (2015) found that gender ambivalence was present in 2.2% of males assigned at birth and 1.9% of females assigned at birth in Belgium.

Estimating the exact prevalence of non-binary transgender people may be difficult as some people have been found to be reluctant to identify as such. Within the UK, 76% of non-binary transgender people have been found to avoid expressing their gender identity in some settings due to fear of negative reactions (Government Equalities Office, 2018). Due to the rigid gender binary that most social constructs adhere to, non-binary transgender people are often left feeling invisible as their gender identity is not validated within these spheres (Fiani & Han, 2018; Mogul-Adlin, 2015; Monro, 2019; Taylor, Zalewska, Gates, & Millon, 2018). There is also less cultural representation of non-binary transgender people (compared to binary transgender people) which is thought to be associated with negative social reactions that non-binary transgender people experience (Nicholas, 2018). Developing language referring and relating to non-binary identifying genders remains problematic, whilst reinforcing invisibility and non-validation, and therefore nonexistence (Jones & Mullany, 2019; Moser & Devereux, 2016). It is therefore evident that non-binary transgender people will be subject to different social challenges when compared to transgender people who identify within the gender binary due to their gender identities being less well understood.

There is a dearth of research with non-binary transgender people but it is these social challenges which are thought to contribute towards the distress that binary transgender people experience (Richards et al., 2015). This has consistently been supported with treatment seeking transgender people (not yet to begin their medical transition) reporting poorer mental health status (e.g., anxiety, depression) compared to cisgender people (e.g., Arcelus, Claes, Witcomb, Marshall, & Bouman, 2016; Bouman et al., 2016a, 2016b, 2017; Dhejne, Van Vlerken, Heylens, & Arcelus, 2016; Witcomb et al., 2018). However, this research has largely failed to distinguish between non-binary and binary transgender people. Only more recently has research started to acknowledge the potential differences between non-binary and binary transgender people. A clinical study within the UK found non-binary transgender youth who were accessing a transgender health service reported poorer mental health (specifically anxiety and depression) when compared to binary transgender youth (Thorne et al., 2018). In contrast, Rimes, Goodship, Ussher, Baker, and West (2017) found in a community sample that there was no difference in mental health between non-binary and binary transgender youth. These findings should be considered in light of the fact that Rimes et al. (2017) did not employ a validated measure to assess mental health and that Thorne et al. (2018) employed a highly selected clinical sample. Although these studies are novel, their findings are contradictory, and they only studied young people (16 to 25 years old). In population-based research, young people have been found to be more vulnerable to poor mental health compared to older populations with one in five young people experiencing anxiety and depression (McManus, Meltzer, Brugha, Bebbington, & Jenkins, 2009). Due to the lack of cisgender people recruited in both Rimes et al. (2017) and Thorne et al.'s (2018) studies, it is difficult to determine whether poor mental health among non-binary transgender people is more or less prevalent than in the cisgender population. Research with the cisgender population has found that 75% of adults diagnosed with a mental health problem have experienced their first symptom by the age of 24 (Kessler et al., 2005), but as they progress into adulthood, they feel more resilient in coping with poor mental health

(Gooding, Hurst, Johnson, & Tarrier, 2012; Netuveli, Wiggins, Montgomery, Hildon, & Blane, 2008). Therefore, there is a need to investigate whether the rates of mental health problems in the adult non-binary transgender population differ from rates in other transgender people as well as in cisgender people.

Poor mental health has been found to be a predictor of low quality of life within the binary transgender population (e.g., Bouman et al., 2016b). Quality of life is the assessment of the psychological, physical, relationship, and environmental domains in life (Harper, 1998). Quality of life among transgender people is severely understudied yet an important outcome variable to assess (Röder et al., 2018; Thompson, Reisner, Vankim, & Raymond, 2015). Systematic reviews and meta-analyses have found quality of life to be poorer among binary transgender people compared to the general population (Murad et al., 2010; Nobili, Glazebrook, & Arcelus, 2018). Gender affirming hormone treatment, social and family support, employment and better mental health have all been associated with better quality of life among binary transgender people (Bouman et al., 2016b; Gómez-Gil et al., 2014; White Hughto & Reisner, 2016). A survey in Sweden found nearly half of transgender respondents (44% of whom were non-binary) reported a poor quality of life (Zeluf et al., 2016), although non-binary transgender people's scores were not explored separately or compared with those of binary people. The study did find that identifying as non-binary, having a negative experience when accessing healthcare, not being able to legally change gender, and a lack of social support were all associated with poor quality of life, while older age was found to be a protective factor among participants (Zeluf et al., 2016). To date, Rimes et al.'s (2017) study is the only empirical research to explicitly compare quality of life among non-binary and binary transgender people and they actually found that non-binary transgender youth had *better* quality of life when compared with binary transgender youth. However, the quality of life measure used had not been validated with transgender people and no cisgender people were employed as a control group. In contrast, a national survey within the UK did find transgender people (binary and non-binary) to report poorer quality of life when compared to cisgender people (Government Equalities Office, 2018). When specific gender identities were explored, transgender men had the lowest quality of life scores, followed by non-binary transgender people and then transgender women (Government Equalities Office, 2018).

In light of the gaps within the literature, this study aimed to explore mental health and quality of life among adult non-binary transgender people and to compare these levels to two control groups (binary transgender people and cisgender people). Only transgender people (non-binary and binary) who had *not* undergone any Gender Affirming Medical Intervention (GAMI) were eligible for this study as these interventions have been shown to have a positive effect on mental health and quality of life (e.g., Dhejne et al., 2016; Nobili et al., 2018; White Hughto & Reisner, 2016). To overcome limitations of previous research, this study also aimed to assess mental health and quality of life more specifically by using a measure that has been developed and validated to use with the binary and non-binary transgender population (see method for more detail). For the comparative analysis, the sample was divided by sex assigned at birth (i.e., male or female).

Based on the limited and contradictory research on mental health and quality of life in these groups (Government Equalities Office, 2018; Rimes et al., 2017; Thorne et al., 2018), no specific hypothesis was made regarding the differences between non-binary and binary transgender people. Given the wealth of research with binary transgender people that has supported the relationship between social distress and mental health (e.g., Dhejne et al., 2016; Witcomb et al., 2018), it was hypothesized that mental health would be poorer among non-binary transgender people when compared to cisgender people. As mental health problems have been shown to be associated with quality of life (e.g., Bouman et al., 2016b), it was also hypothesized that when compared to cisgender people, non-binary transgender people would report poorer quality of life.

Method

Participants and recruitment

A community sample of transgender and cisgender participants aged 18 and over was invited to take part in this study over four months in 2016. Snowball sampling was used to recruit participants. An invitation to participate was initially distributed to LGBTQ + organizations within the UK, via email and social media sites. Each participant that took part was asked to pass on the survey link to their social network. The content of the recruitment advertisement was the same for transgender (non-binary and binary) and cisgender people. The study was approved by Loughborough University Research Ethics Committee, Loughborough, UK.

Procedures

After reading the information sheet, participants that decided to take part were invited to complete the survey online which took 15–20 minutes to complete.

Measures

Socio-demographics

Participants provided information about their age, sex assigned at birth, and gender identity. For this study, people who selected their gender identify as transgender male or female were classified as binary transgender people. Participants who selected androgynous ($n = 6$), gender neutral ($n = 7$), non-binary ($n = 32$), pangender ($n = 1$), bigender ($n = 3$), gender queer ($n = 13$), gender fluid ($n = 16$), or other ($n = 20$) were classified as non-binary transgender people. As an example, people who selected "other" self-identified as "intergender," "agenderflux," "gender creative," and "agender".

Measures to assess mental health and quality of life

To assess mental health, the psychological functioning subscale from the Gender Congruence and Life Satisfaction Scale (GCLS; Jones, Bouman, Haycraft, & Arcelus, 2019a) was used. To assess quality of life, the life satisfaction subscale of the GCLS was also employed. The GCLS was chosen as it was specifically designed for, and validated with, the transgender population and assesses these constructs in relation to gender congruence (i.e., incongruence between sex assigned at birth and gender identity). The GCLS was also designed to be inclusive of non-binary transgender people due to the gender-neutral language it employs.

The World Health Organization Quality of Life-BREF (WHOQOL-BREF; Harper, 1998) was also employed as it is widely used to assess quality of life in health-related research and therefore enables findings from the current study to be compared to previous literature with the general population, as well as with the few studies with transgender people who have employed the WHOQOL-BREF (De Vries et al., 2014; Gómez-Gil et al., 2014). These measures are discussed in more detail below.

Gender Congruence and Life Satisfaction Scale (GCLS; Jones et al., 2019a)

The GCLS aims to measure changes in gender (in)congruence, body satisfaction, mental health, and life satisfaction in transgender people. Participants are invited to rate their responses on a five-point Likert scale (always = 1; never = 5). A higher score is associated with a positive outcome (i.e., greater gender congruence, greater body satisfaction, greater gender-related health, and greater life satisfaction). There are seven subscales, two of which were used in the current study (psychological functioning and life satisfaction). Within the current sample, the Cronbach's alphas for the psychological functioning subscale ($\alpha = .93$) and for the life satisfaction subscale ($\alpha = .83$) indicated good reliability.

World Health Organization Quality of Life-BREF (WHOQOL-BREF; Harper, 1998)

The WHOQOL-BREF is a cross-culturally comparable quality of life measure. This measure assesses quality of life via 26 items comprising four subscales: physical health (e.g., "*Do you have enough energy for everyday life*?"), psychological (e.g., "*To what extent do you feel your life to be meaningful*?"), social relationships (e.g., "*How*

satisfied are you with the support you get from your friends?"), and environment (e.g., "*How satisfied are you with your access to health services?*"). There is also an item that assesses overall quality of life which was administered for this study. Participants are asked to rate their responses on a five-point Likert scale (anchored from 1 to 5). Although the anchor remains the same throughout, the wording of the response scale differs for some questions (e.g., "very dissatisfied" to "very satisfied"; "never" to "always"; "very poor" to "very good"). Each subscale score is generated by calculating the mean and multiplying this by four. The rationale for multiplying the mean score by four is to make the scores from the WHOQOL-BREF comparable to the WHOQOL-100 (Harper, 1998), which is the longer, original questionnaire. A higher score indicates a higher quality of life. The WHOQOL-BREF has been found to have good reliability across 23 countries (Skevington, Lofty, & O'Connell, 2004) and to be acceptable, reliable and valid among transgender women (Thompson et al., 2015). In the current sample, the Cronbach's alphas for the four subscales were all good ($\alpha = .78$ to $\alpha = .90$). It is not possible to calculate the Cronbach's alpha for a single item (overall quality of life).

Analysis

The data were analyzed using SPSS 23 (IBM, 2016). The data were not normally distributed and, as there is no non-parametric alternative, robust parametric tests were selected (Field, 2009). To explore differences in mental health and quality of life between non-binary transgender people and controls (binary transgender people and cisgender people), a series of ANCOVAs were conducted to control for the effects of age. Age was controlled for as descriptive analysis demonstrated a significant difference in age between groups (see below). The sample was divided by sex assigned at birth (i.e., male or female) and these groups were analyzed in relation to their gender identity (i.e., non-binary transgender, binary transgender, or cisgender). This analysis was then followed up with Sidak post-hoc tests (as more conservative than Bonferroni corrections) to determine where any significant differences lay. The significance level was set at $p < 0.05$. For the post-hoc comparisons, Cohen's d effect sizes were also calculated (0.2 = small, 0.5 = medium and $\geq$ 0.8 = large effect; Cohen, 1988).

Results

Descriptive analysis

In total, 833 people participated in the study. Seven people were removed as they provided no information about their gender (sex assigned at birth or gender identity) and a further 37 people were removed as they identified as cisgender but reported that their sex assigned at birth was different to their gender identity. For the purpose of this study, only people who were not on gender affirming hormone treatment or had not undergone gender-affirming surgery were included within the analysis to allow to meaningful comparisons. Therefore, a further 263 people were removed. As it was *not* the aim of the current study to determine the outcomes from GAMI among non-binary and binary transgender people, a homogenous group (in relation to GAMI) was seen as necessary in light of the positive effect these interventions can have of mental health and quality of life (e.g., Dhejne et al., 2016; Nobili et al., 2018; White Hughto & Reisner, 2016).

The final sample consisted of 526 people. Of this sample, 97 were classified as non-binary transgender people, 91 as binary transgender people, and 338 identified as cisgender people. The distribution of sex assigned at birth is displayed in Table 1.

The mean age of the whole sample was 35.70 years ($SD = 13.16$). For the mean age of each group see Table 1. There was a significant group effect for age ($F(2, 519) = 3.14$, $p = .044$). Post-hoc tests revealed that cisgender people were significantly older compared to non-binary transgender people (Mean difference = 3.80; $p = .037$). There was no significant difference in age between cisgender people and binary identifying transgender people (Mean difference = 0.69; $p = .960$). There was also no significant difference in age between binary and non-binary transgender people (Mean difference = 3.11; $p = .288$).

Comparing non-binary transgender people assigned male at birth (AMAB) with controls (transgender females and cisgender males)

A total of 160 participants were included in this comparative analysis (while controlled for age); 31 non-binary transgender people, 45 transgender females, and 84 cisgender males.

Mental health

For the psychological functioning subscale of the GCLS there was a significant main effect when non-binary transgender people (AMAB) were compared with controls (transgender females and cisgender males; see Table 2). Post-hoc tests revealed that non-binary transgender people (AMAB) scored significantly higher than transgender females, indicating that they had higher psychological functioning, but this was not as high as for cisgender males (see Table 3). These findings indicate that cisgender males had the highest psychological functioning of the three groups, followed by non-binary people (AMAB) and then transgender females.

Quality of life

For the life satisfaction subscale of the GCLS there was also significant main effect when non-binary transgender people (AMAB) were compared with controls (transgender females and cisgender males; see Table 2). Post-hoc tests demonstrated that there was no significant difference in life satisfaction between non-binary

Table 1. Age and assigned sex at birth for non-binary transgender people, binary transgender people and cisgender people.

	Non-binary transgender ($n = 97$)	Binary transgender ($n = 91$)	Cisgender ($n = 338$)
	Mean (SD)		
Age in years	32.72 (12.17)	35.44 (16.48)	36.32 (12.03)
N (%)			
Sex assigned at birth			
Female	66 (67.3)	46 (50.5)	254 (75.1)
Male	31 (31.6)	45 (49.5)	84 (24.9)

Table 2. Means (SD) and ANCOVA test scores for non-binary transgender people assigned male at birth and with controls (transgender females and cisgender males) on mental health and quality of life.

	Non-binary transgender people ($n = 31$)	Transgender females ($n = 45$)	Cisgender males ($n = 84$)	F
GCLS				
Psychological functioning	3.81 (.83)	3.31 (.91)	4.79 (.54)	65.82***
Life satisfaction	3.18 (.78)	3.02 (.81)	3.75 (.68)	16.50***
WHOQOL-BREF				
Physical health	13.88 (3.55)	14.58 (3.23)	15.50 (2.89)	3.42*
Psychological	12.13 (2.27)	10.92 (1.99)	13.57 (2.33)	19.51***
Social relationships	12.30 (4.05)	10.65 (3.58)	13.45 (4.37)	5.42**
Environment	14.31 (2.86)	14.03 (3.16)	15.12 (2.17)	9.97***
Overall quality of life	3.42 (1.06)	3.00 (.98)	4.01 (.75)	21.16***

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
GCLS: Gender Congruence and Life Satisfaction Scale; WHOQOL-BREF: World Health Organization Quality of Life Scale-BREF.

Table 3. Post-hoc tests: Mean difference and effect sizes between non-binary transgender people assigned male at birth compared with controls (transgender females and cisgender males).

	Non-binary vs. transgender females		Non-binary vs. cisgender males	
	Mean difference	Cohen's d	Mean difference	Cohen's d
GCLS				
Psychological functioning	.51**	.59	−.98***	1.42
Life satisfaction	.15	.19	−.57***	.81
WHOQOL-BREF				
Overall quality of life	.47	.46	−1.01***	1.12
Physical health	.69	.20	−1.61*	.36
Psychological	1.19	.56	−2.68***	1.17
Social relationships	1.62	.42	−2.76***	.66
Environmental	.27	.26	−1.68***	.67

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
GCLS: Gender Congruence and Life Satisfaction Scale; WHOQOL-BREF: World Health Organization Quality of Life Scale-BREF.

Table 4. Means (SD) and ANCOVA test scores for non-binary transgender people assigned female at birth and with controls (transgender males and cisgender females) on mental health and quality of life.

	Non-binary transgender people ($n = 66$)	Transgender males ($n = 46$)	Cisgender females ($n = 254$)	F
GCLS				
Psychological functioning	3.59 (1.13)	2.82 (.79)	4.86 (.35)	230.46***
Life satisfaction	3.16 (.83)	2.90 (.64)	3.95 (.57)	71.09***
WHOQOL-BREF				
Physical health	12.25 (3.74)	13.21 (3.02)	15.44 (2.90)	33.56***
Psychological	11.63 (2.71)	10.38 (2.26)	14.20 (1.84)	74.32***
Social relationships	13.08 (4.01)	11.10 (3.89)	14.87 (3.58)	21.77***
Environmental	13.11 (3.09)	13.18 (3.43)	15.88 (2.38)	40.05***
Overall quality of life	3.31 (1.09)	3.07 (.95)	4.21 (.70)	50.95***

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
GCLS: Gender Congruence and Life Satisfaction Scale; WHOQOL-BREF: World Health Organization Quality of Life Scale-BREF.

identifying transgender people (AMAB) and transgender females. However, non-binary people (AMAB) scored significantly lower on the life satisfaction subscale of the GCLS compared to cisgender males (see Table 3).

A significant main effect was found for the physical, psychological, social, environmental, and overall quality of life WHOQOL-BREF subscales between non-binary identifying transgender people (AMAB) when compared with controls (transgender females and cisgender males; see Table 2). On the overall quality of life subscale, there was no significant difference in scores between non-binary individuals (AMAB) and transgender females. Non-binary transgender people (AMAB), however, did score lower when compared to cisgender males (see Table 3). On the physical health, psychological, social relationships, and environmental subscales there was also no significant difference between non-binary transgender people (AMAB) and transgender females, although non-binary transgender people (AMAB) scored significantly lower compared to cisgender males (see Table 3).

Overall, these findings demonstrate that cisgender males had the highest quality of life, followed by non-binary transgender people (AMAB) and transgender females who had similar scores on the GCLS life satisfaction scale and across the WHOQOL-BREF subscales.

Comparing non-binary transgender people assigned female at birth (AFAB) with controls (transgender men and cisgender females)

For this analysis 366 people were compared (while age was controlled for); 66 non-binary transgender people, 46 transgender males, and 254 cisgender females.

Mental health

There was a significant main effect for the GCLS psychological functioning subscale when non-binary transgender people (AFAB) were compared to controls (transgender males and cisgender females; see Table 4). Post-hoc tests showed that non-binary transgender people (AFAB) scored significantly higher when compared to transgender males, but lower when compared to cisgender females (see Table 5). This finding suggests that cisgender females had the highest psychological functioning, followed by non-binary people (AFAB) and then transgender males.

Quality of life

There was a significant main effect for the GCLS life satisfaction subscale when non-binary transgender people (AFAB) were compared with controls (transgender males and cisgender females; see Table 4). There was no significant difference between non-binary transgender people (AFAB) and transgender males. However, non-binary transgender people (AFAB) did score lower when compared to cisgender females (see Table 5). This means that cisgender females scored the highest on this subscale followed by non-binary transgender people (AFAB) and transgender males who scored similar.

There was also a significant main effect for the physical, psychological, relationships, environmental, and overall quality of life subscales of the WHOQOL-BREF (see Table 4). On the

Table 5. Post-hoc tests: Mean difference and effect sizes between non-binary transgender people assigned female at birth with controls (transgender males and cisgender females).

	Non-binary vs. transgender males		Non-binary vs. cisgender females	
	Mean difference	Cohen's d	Mean difference	Cohen's d
GCLS				
Psychological functioning	.73***	.76	−1.30***	1.76
Life satisfaction	.21	.28	−.84***	1.20
WHOQOL-BREF				
Overall quality of life	.22	.26	−.88***	.98
Physical health	.96	.28	−3.20***	.96
Psychological	1.24**	.50	−2.44***	1.07
Social relationships	1.88*	.48	−1.88***	.49
Environmental	−.06	.02	−2.70***	.99

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.
GCLS: Gender Congruence and Life Satisfaction Scale; WHOQOL-BREF: World Health Organization Quality of Life Scale-BREF.

WHOQOL-BREF overall quality of life subscale, there was no significant difference between non-binary transgender people (AFAB) and transgender males. However, non-binary transgender people (AFAB) scored significantly lower when compared to cisgender females (see Table 5).

On the physical health quality of life subscale there was no significant difference between non-binary transgender people and binary transgender people (AFAB). However, non-binary transgender people (AFAB) did score significantly lower on this subscale when compared to cisgender females. On the psychological and social relationships subscale, non-binary transgender people (AFAB) scored significantly higher compared to transgender males, but non-binary transgender people (AFAB) scored significantly lower when compared to cisgender females. For the environmental subscale, there was no significant difference between non-binary transgender people (AFAB) and transgender males. Both non-binary and binary transgender people (AFAB) scored significantly lower when compared to cisgender females (see Table 5).

These findings indicate that for all the WHOQOL-BREF subscales assessed, cisgender females had the highest quality of life when compared to non-binary transgender people (AFAB). On the overall, physical health and environmental subscales, non-binary transgender people (AFAB) and transgender males scored similar. However, on the psychological and social relationships subscales, non-binary transgender people (AFAB) had higher quality of life compared to transgender males.

Discussion

This is the first study to compare mental health and quality of life among a community sample of non-binary people whilst employing a control groups (binary trans and cisgender people) and a specific validated measure to assess these constructs (i.e., measure developed and validated with transgender people). In the assigned male at birth groups, non-binary transgender people reported better mental health when compared to transgender females. These groups did not differ significantly in relation to quality of life scores. In relation to those assigned female at birth, mental health was also found to be better among non-binary transgender people when compared to transgender males. On the psychological and social relationships domains of quality of life, non-binary transgender people (assigned female at birth) also reported better status when compared to transgender males. There were no other significant differences on the quality of life domains between non-binary transgender people (assigned female at birth) and transgender males. Cisgender males and females consistently reported better mental health and quality of life than both transgender groups.

With regard to mental health, the current study's findings support Rimes et al. (2017) but contradict the findings of Thorne et al. (2018). These findings can be explained by the fact that in Thorne et al.'s study the average age was 21 and their sample consisted of treatment seeking non-binary young people. Younger age, gender incongruence and body dissatisfaction are risk factors for poor physical and mental health (e.g.,

Arcelus et al., 2016; Patel, Flisher, Hetrick, & McGorry, 2007), while the community sample's average age in the current study was 37 years old and were not specifically treatment-seeking. Non-binary transgender people recruited from the community and not undergone any gender affirming medical interventions have been found to report lower levels of gender incongruence and body dissatisfaction when compared to binary transgender people (Jones, Haycraft, Bouman, & Arcelus, 2019b). Consequently, lower levels of gender incongruence and body dissatisfaction may explain why non-binary transgender people were found to report better (although still poorer than cisgender people) mental health compared to binary transgender people.

Instead, poor mental health within the non-binary transgender population (compared to cisgender people) may be better explained by the challenges non-binary transgender people experience when having to navigate themselves in a society that so strongly advocates and emphasizes the gender binary (Fiani & Han, 2018; Nicholas, 2018). Although these social challenges have been found to contribute towards poor mental health among binary transgender people, they are likely to be a more prominent explanation due to the lower levels of gender incongruence and body dissatisfaction that non-binary transgender people experience (Jones et al., 2019b). The stressors non-binary transgender people experience are also likely to be different to those experienced by binary transgender people. For example, non-binary gender identities are often felt to be impossible or unnatural; also known as binary genderism (Nicholas, 2018). Gendered pronouns could be an additional cause of distress as many languages, including the English and Spanish language, do not possess non-gendered pronouns. This is likely to leave non-binary transgender people feeling as if their gender identity is not socially recognized and hence validated (e.g., Fiani & Han, 2018; Monro, 2019; Vincent, 2019).

Despite non-binary transgender people having better mental health than binary transgender people, overall there were no differences in quality of life between these two groups. It is therefore likely that variables differently mediate the relationship between mental health and quality of life among non-binary and binary transgender people. For binary treatment seeking individuals, gender incongruence and body dissatisfaction are likely to have a prominent role in the relationship between mental health and quality of life (e.g., Jones et al., 2019b). Whereas social support, loneliness, and isolation may play a more significant role in explaining the relationship between mental health and quality of life among non-binary transgender people due to the intolerant attitudes held towards non-binary transgender people within cis- and hetero-normative societies (Nicholas, 2018). Therefore, future research should be concerned with exploring meditators of the relationship between mental health and quality of life in non-binary and binary transgender people separately to inform more specific intervention for these groups.

In terms of prevention of mental health problems and improvement of quality of life within the non-binary transgender population, societal level change is needed. Less emphasis needs to be placed on the gender binary so that those who fall outside of this in terms of gender identity feel less socially isolated and invisible. There is thought to be a relatively high and increasing proportion of young people identifying as non-binary, which provides a valid reason, and strengthens the need, to consider how to prevent vulnerability to mental health problems (Clark, Veale, Townsend, Frohard-Dourlent, & Saewyc, 2018; Government Equalities Office, 2018). Aiming initiatives at children and young people is likely to be the most impactful and have lasting effects. For example, a "Gender Friendly" nursery program rolled out over several nurseries in Glasgow, UK was found to be effective in changing practices around gender to ensure that the way in which the nurseries were operating was not reinforcing the gender binary and instead promoting gender equality (e.g., stopping divided play activities by gender, stopping gendered birthday cards; Heywood, 2018).

Better and more widely available mental health support is also important due to the elevated levels of poor mental health among non-binary transgender people (when compared to cisgender people) that were found in the current study. Many transgender people who access mental

health support are understandably apprehensive and critical of these services as they often are not only non-inclusive, but also fail to offer support and treatment tailored to individual mental health needs (Government Equalities Office, 2018; Hoffman, Freeman & Swann, 2009). Therefore, mental health providers and those who commission these services need to work with non-binary identifying communities to ensure interventions are tailored to their needs.

However, the study's findings must be considered in light of the fact that the sample sizes in the assigned female groups were different (non-binary, transgender females, and cisgender females). There were a larger number of cisgender females compared to the transgender groups, which may have influenced the results, although the study employed robust statistical tests that are able to withstand uneven group sizes. This study also recruited people from the UK and therefore the findings are likely to only be applicable to such a population. Different countries have different healthcare systems and legislation regarding transgender people and therefore such factors may differently affect mental health and quality of life. Cross-cultural studies are needed to explore differences in more detail. Future research should also consider socio-demographic factors (such as educational level, ethnicity, religion, and income) which may further contribute to mental health and quality of life among non-binary and binary transgender people.

In conclusion, there is an inequality with regard to mental health and quality of life between non-binary and binary transgender people and the cisgender population that needs to be addressed. Poor mental health and quality of life among binary transgender people is likely to be associated with gender incongruence and body dissatisfaction. The inequality between non-binary and cisgender people with regards to mental health and quality of life is likely to have a social cause hence legislative measures should be put in place to abolish the gender binary and remove the need to comply with such an inflexible social construct.

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Conflict of interest

The authors declare that they have no conflict of interest.

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